

What is claimed is:

1. A resin, C, consisting essentially of the reaction product of A with K, wherein A has at least one cross-linkable functional group; and K is a cross-linking agent consisting essentially of a polyepoxide.
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2. The resin according to claim 1, wherein the mole ratio of reactive functionalities of K:A is at least about 1:1.
- 10 3. The resin according to claim 1, wherein A is a water soluble and/or dispersible creping precursor.
4. The resin according to claim 1, wherein A is a member of the group consisting of hydroxylated polymer, carboxylated polymer, sulfonate-containing polymer, phosphate-containing polymer, amine-containing polymer, polyamidoamine-containing polymer and combinations thereof.
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5. The resin according to claim 4, wherein A is a member of the group consisting of polyamidoamine, polyamine and polyaminoacid.
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6. The resin of claim 5, wherein the suitable polyamidoamine is a member of the group consisting of adipic acid-diethylenetriamine, dimethylglutarate-diethylenetriamine, caprolactam-itaconic acid-diethylenetriamine, caprolactam-itaconic acid-6-aminohexanoic acid-diethylenetriamine, and methylbisamino-propylamine-oxalic acid-urea.
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7. The resin of claim 5, wherein the polyamine is a member of the group consisting of polyvinylamine, modified and unmodified polyethylenimine, polymethyldiallylamine, polydiallylamine, hexamethylenediamine and polylysine.

8. The resin of claim 5, wherein the polyaminoacid is a member of the group consisting of caprolactam, 6-aminohexanoic acid, polylysine, polyalanine polyhistidine, proteins and peptides containing at least one amino acid.

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9. The resin according to claim 1, wherein A has at least one cross-linkable group, and wherein the cross-linking agent K is at least one polyepoxide selected from the group consisting of glycerol triglycidyl ether (triglycidyl glycerol), triphenylolmethane triglycidyl ether, trimethylolethane triglycidyl ether, trimethylolpropane triglycidyl ether, 1,2,4-butanetriol triglycidyl ether, 1,2,6-hexanetriol triglycidyl ether, 1,2,3-heptanetriol triglycidyl ether, pentaerythritol triglycidyl ether, 1,1,1-tris(4-hydroxyphenyl)- ethane triglycidyl ether, calix[4]arene triglycidyl ether, calix[6]arene triglycidyl ether, 4-*t*-butylcalix[4]arene triglycidyl ether, 4-*t*-butylcalix[6]arene triglycidyl ether, pyrogallol triglycidyl ether, 1,2,4-benzenetriol triglycidyl ether, phloroglucinol triglycidyl ether, and triglycidylisocyanurate.

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10. The resin according to claim 9, wherein the polyepoxide is triglycidylisocyanurate.

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11. The resin according to claim 1, wherein the at least one cross-linkable functional group of A is a member of the group consisting of carboxylic acids, esters, alkyl halides, phosphonic acids, phosphoric acids, sulfuric acids, sulphonic acids, aromatic halides, alcohols, epoxides, phosphates, sulfonates, azetidiniums, anhydrides, alkeneimine and amines.

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12. The resin according to claim 1, wherein A is in solution, the solution having a solids content from about 30% to about 70% by weight based on solids.

13. The resin, C, comprising the formula A-K of claim 1, wherein the resin is selected from one of:

A is adipic acid-diethylenetriamine polymer; and K is triglycidylisocyanurate.

- 5 A is caprolactam-itatonic acid-diethylenetriamine polymer; and K is triglycidylisocyanurate.

A is caprolactam-itatonic acid-6 aminohexanoic acid-diethylenetriamine polymer; and K is triglycidylisocyanurate.

- 10 A is dimethylglutarate-diethylenetriamine polymer; and K is triglycidylisocyanurate.

A is polyethyleneimine polymer; and K is triglycidylisocyanurate.

A is polymethyldiallylamine polymer; and K is triglycidylisocyanurate.

A is methylbisamino propylamine-oxalic acid -urea polymer; and K is triglycidylisocyanurate.

- 15 14. A process for preparing a resin, C, comprises reacting A with K, wherein A has at least one cross-linkable functional group; and K is a cross-linking agent consisting essentially of a polyepoxide.

- 20 15. The process according to claim 14, wherein the mole ratio reactive functionalities of K:A is at least about 1:1.

16. The process according to claim 14, wherein A is a water soluble and/or dispersible creping precursor.

- 25 17. The process according to claim 14, wherein A is a member of the group consisting of hydroxylated polymer, carboxylated polymer, sulfonate-containing polymer,

phosphate-containing polymer, amine-containing polymer, polyamidoamine-containing polymer and combinations thereof.

18. The process according to claim 17, wherein A is a member of the group consisting
5 of polyamidoamine, polyamine and polyaminoacid.
19. The process of claim 18, wherein the suitable polyamidoamine is a member of the
group consisting of adipic acid-diethylenetriamine, dimethylglutarate-
diethylenetriamine, caprolactam-itaconic acid-diethylenetriamine, caprolactam-
10 itaconic acid-6-aminohexanoic acid-diethylenetriamine, and
methylbisaminopropylamine-oxalic-urea.
20. The process of claim 18, wherein the polyamine is a member of the group
consisting of polyvinylamine, modified and unmodified polyethylenimine,
15 polymethyldiallylamine, polydiallylamine, hexamethylenediamine and polylysine.
21. The process of claim 18, wherein the polyaminoacid is a member of the group
consisting of caprolactam, 6-aminohexanoic acid, polylysine, polyhistidine,
polyalanine, protein and peptides containing at least one amino acid.
22. The process according to claim 14, comprising A having at least one cross-linkable
group, and wherein the cross-linking agent K consists essentially of a polyepoxide
selected the group consisting of glycerol triglycidyl ether (triglycidyl glycerol),
triphenylolmethane triglycidyl ether, trimethylolethane triglycidyl ether,
25 trimethylolpropane triglycidyl ether, 1,2,4-butanetriol triglycidyl ether, 1,2,6-
hexanetriol triglycidyl ether, 1,2,3-heptanetriol triglycidyl ether, pentaerythritol
triglycidyl ether, 1,1,1-tris(4-hydroxyphenyl)- ethane triglycidyl ether, calix[4]arene
triglycidyl ether, calix[6]arene triglycidyl ether, 4-*t*-butylcalix[4]arene triglycidyl

ether, 4-*t*-butylcalix[6]arene triglycidyl ether, pyrogallol triglycidyl ether, 1,2,4-benzenetriol triglycidyl ether, phloroglucinol triglycidyl ether, and triglycidylisocyanurate.

- 5 23. The process according to claim 22, wherein the polyepoxide is triglycidylisocyanurate.
24. The process according to claim 14, wherein the at least one cross-linkable functional group of A is a member of the group consisting of carboxylic acids, phosphonic acids, phosphoric acids, sulfuric acids, sulphonic acids, esters, alkyl
10 halides, aromatic halides, alcohols, epoxides, phosphates, sulfonates, azetidiniums, anhydrides, alkeneimine and amines.
25. The process according to claim 14, wherein A is in solution, the solution having a
15 solids content from about 30% to about 70% by weight based on solids.
26. The process of claim 14 further comprising quenching the reaction using an acid wherein a resin solution is about 15% to about 50% by weight based on solids.
- 20 27. The process of claim 14 further comprising quenching the reaction using a sulfite wherein a resin solution is about 10% to about 60% by weight based on solids.
28. The resin of claim 1, wherein said resin has a solids content from about 10% to about 50% by weight based on solids.
- 25 29. A resin produced by the process of claim 28.